WHAT IS CLAIMED IS:

1. A method for halftoning a multi-channel digital color image having an x,y array of color pixel values, wherein at least two color channels are similar having substantially the same color but with low- and high-densities, comprising the steps of:

a) providing a matrix of dither values for each group of similar color channels wherein two or more of the matrices of dither values are designed jointly to minimize a visual cost function;

b) for at least one group of similar color channels, forming an inverted matrix of dither values by subtracting the value of each element of the matrix of dither values for that group from a predetermined maximum value, associating the inverted matrix of dither values with one of the low- or high-density color channels, and associating the matrix of dither values for that group with the other low- or high-density color channel of that group;

c) for each color channel of the multi-channel digital color image modularly addressing the matrix of dither values associated with that color channel using the location of a pixel in the digital color image to obtain ad addressed dither value;

d) using the addressed dither value for each color channel, together with the pixel value for the corresponding color channel, to determine an output halftone image value for each color channel; and

e) repeating steps c) and d) for each pixel in the multi-channel digital color image.

2. The method of claim 1 wherein step d) includes the step of comparing the addressed dither value for each color channel with the pixel value for the corresponding color channel to determine the output halftone image value for each color channel.

3. The method of claim 1 wherein step d) includes the step of adding the addressed dither value for each color channel to the pixel value for the corresponding color channel and comparing the sum to a threshold value to determine the output halftone image value for each color channel.

4. The method of claim 1 wherein step d) includes the step of using the addressed dither value to select a dither look-up table from a set of dither look-up tables, and using the pixel value of the corresponding color channel to address the selected dither look-up table to determine an output halftone image value for each color channel.

5. The method of claim 1 wherein at least one of the color channels is printed using more than two output levels.

6. The method of claim 5 wherein step d) includes the step of adding the addressed dither value for each color channel to the pixel value for the corresponding color channel and quantizing the sum to determine the output halftone image value for each color channel.

7. The method of claim 6 wherein the sum is quantized using a division operator.

8. The method of claim 6 wherein the sum is quantized by addressing a quantization look-up table with the sum.

9. The method of claim 5 wherein step d) includes the step of using the addressed dither value to select a dither look-up table from a set of dither look-up tables, and using the pixel value of the corresponding color channel to address the selected dither look-up table to determine the output halftone image value for each color channel.

10. The method of claim 1 wherein one group of similar color channels is comprised of a low-density cyan color channel and a high-density cyan color channel.

11. The method of claim 1 wherein one group of similar color channels is comprised of a low-density magenta color channel and a high-density magenta color channel.

12. The method of claim 1 wherein one group of similar color channels is comprised of a low-density yellow color channel and a high-density yellow color channel.

13. The method of claim 1 wherein one group of similar color channels is comprised of a low-density neutral color channel and a high-density neutral color channel.

14. A computer program product that performs the method of claim 1.

15. A set of dither matrices for halftoning a multi-channel digital color image having an x,y array of color pixel values, wherein at least two color channels are similar having substantially the same color but with low- and high-densities, comprising:

a) a matrix of dither values for each group of similar color channels wherein two or more of the matrices of dither values are designed jointly to minimize a visual cost function; and

b) for at least one group of similar color channels, an inverted matrix of dither values formed by subtracting the value of each element of the matrix of dither values for that group from a predetermined maximum value, the inverted matrix of dither values being associated with one of the low- or high-density color channels, and the matrix of dither values for that group being associated with the other low- or high-density color channel.

16. A method for halftoning a multi-channel digital color image having an x,y array of color pixel values, wherein at least two of the color channels are similar having substantially the same color but with low- and high-densities, comprising the steps of:

a) providing a set of dither bitmaps for each group of similar color channels wherein the dither bitmaps for at least two of the groups of similar color channels are designed jointly to minimize a visual cost function;

b) for at least one group of similar color channels, forming an inverted set of dither bitmaps by subtracting the value of each element of the dither bitmaps for that group from a predetermined maximum value, associating

the inverted set of dither bitmaps with one of the low- or high-density color channels, and associating the set of dither bitmaps for that group with the other low- or high-density color channel;

c) for each color channel of the multi-channel digital color image, selecting the dither bitmap from the set of dither bitmaps associated with that color channel corresponding to the pixel value for a pixel in the multi-channel digital color image;

d) for each color channel modularly addressing the selected dither bitmap with the location of the pixel to obtain an output halftone image value; and

e) repeating steps c) and d) for each pixel in the multi-channel digital color image.

17. The method of claim 16 wherein at least one of the color channels is printed using more than two output levels.

18. The method of claim 16 wherein one group of similar color channels is comprised of a low-density cyan color channel and a high-density cyan color channel.

19. The method of claim 16 wherein one group of similar color channels is comprised of a low-density magenta color channel and a high-density magenta color channel.

20. The method of claim 16 wherein one group of similar color channels is comprised of a low-density yellow color channel and a high-density yellow color channel.

21. The method of claim 16 wherein one group of similar color channels is comprised of a low-density neutral color channel and a high-density neutral color channel.

22. A computer program product that performs the method of claim 16.

23. A set of dither bitmaps for halftoning a multi-channel digital color image having an x,y array of color pixel values, wherein at least two color channels are similar having substantially the same color but with low- and high-densities, comprising:

a) a set of dither bitmaps for each group of similar color channels wherein two or more of the sets of dither bitmaps are designed jointly to minimize a visual cost function; and

b) for at least one group of similar color channels, an inverted set of dither bitmaps formed by subtracting the value of each element of the dither bitmaps for that group from a predetermined maximum value, the inverted set of dither bitmaps being associated with one of the low- or high-density color channels, and the set of dither bitmaps for that group being associated with the other low- or high-density color channel.